

Armed Forces College of Medicine
AFCM



Cranial Cavity1

By

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INTENDED LEARNING OBJECTIVES (ILO)

By the end of this lecture the student will be able to:

1. Name the different Dural folds
2. describe their positions, shape, attachments
3. Mention their contents & function
4. Describe the intracranial course of the internal carotid artery
5. Describe course, surface anatomy and applied anatomy of the middle meningeal artery

Norma basalis interna



Frontal crest

Crista galli

Anterior clinoid process

Posterior clinoid process

Petrous part of temporal

Transverse sulcus



MENINGES OF THE BRAIN



MENINGES OF THE BRAIN

- I- DURA MATER
- II- ARACHNOID MATER
- III- PIA MATER

MENINGES OF THE BRAIN



1- Dura Mater (outer layer)

2- Arachnoid Mater (middle layer)

3- Pia Mater (inner layer)

Middle meningeal vein and artery

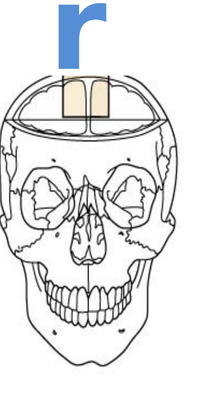
MENINGES OF THE BRAIN



Pia mater



- It is a thin, delicate membrane that closely invests the surface of the brain.
- It follows the contours of the brain, entering grooves and fissures on its surface



MENINGES OF THE BRAIN



Arachnoid mater

- It is a thin membrane.
- From its inner surface thin trabeculae extend downward, cross the subarachnoid space, and become continuous with pia mater

Arachnoid

MENINGES OF THE BRAIN



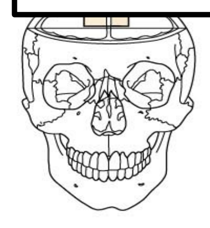
Dura Mater

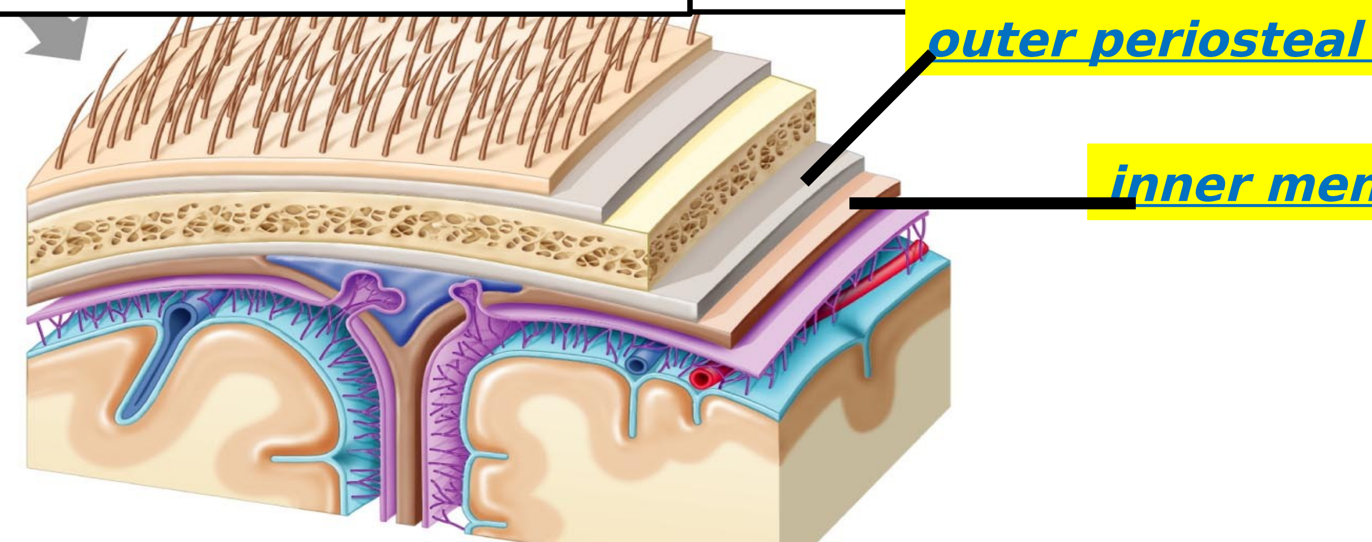
1- the outer periosteal layer

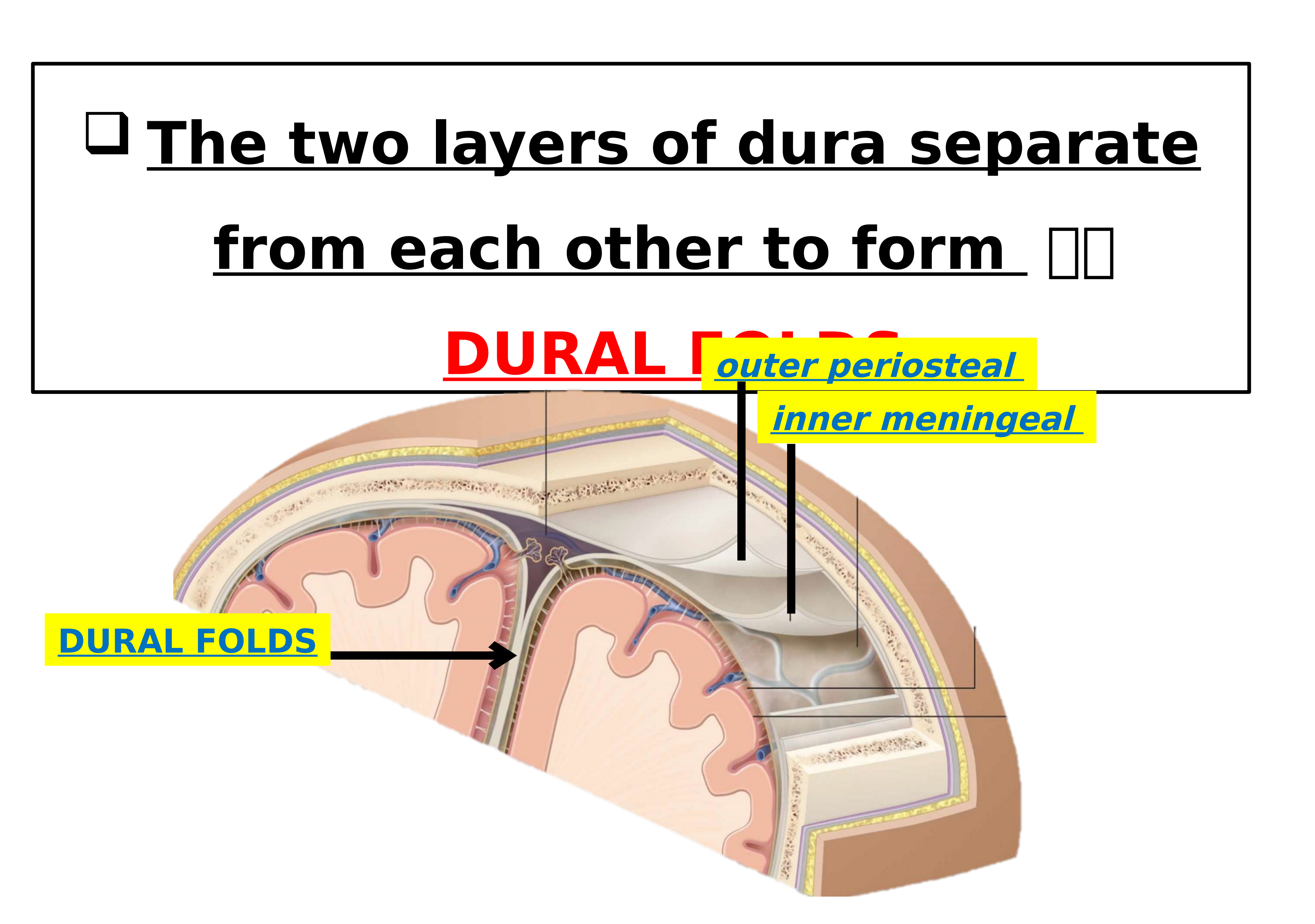
- It is the periosteum of the cranial cavity.
- It is firmly attached to the skull.

2- the inner meningeal layer

- It is in close contact with the arachnoid mater
- It is continuous with the dura mater of spinal cord.






The two layers of dura separate from each other to form
DURAL FOLDS
outer periosteal
inner meningeal
DURAL FOLDS

Dural Folds

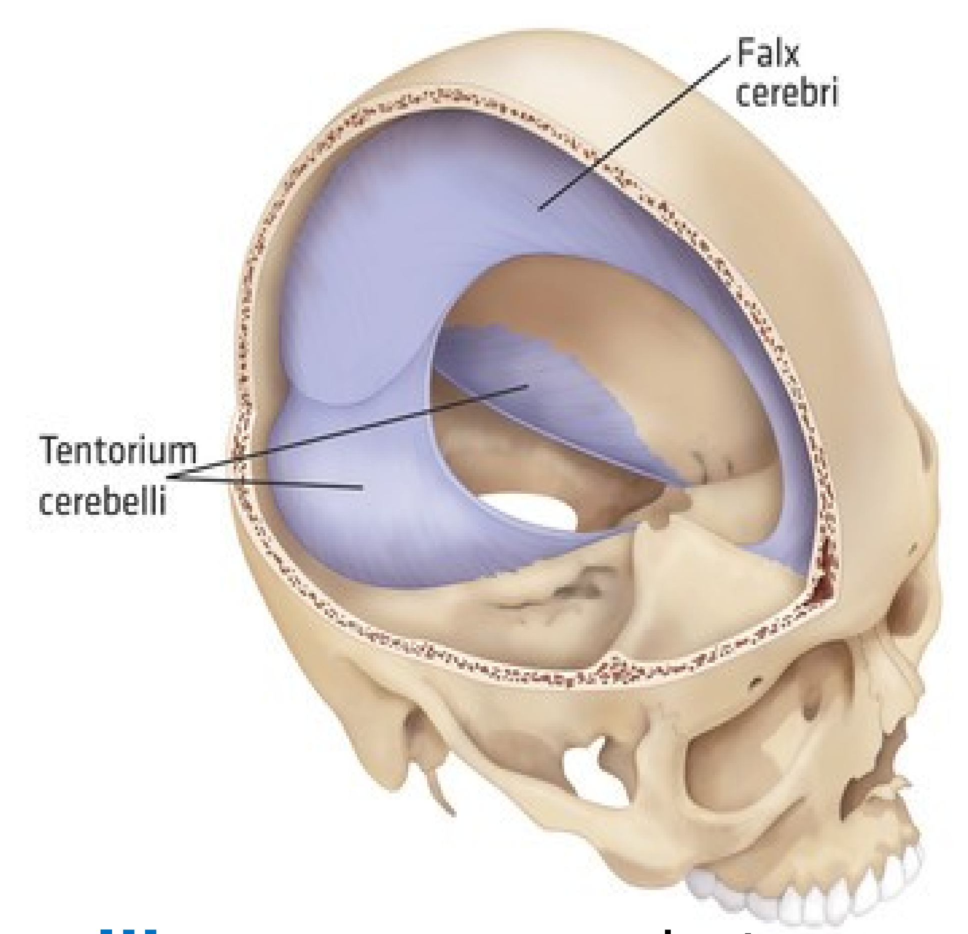


1) Falx Cerebri

2)Tentorium Cerebelli

3)Falx Cerebelli

4)Diaphragma Sellae

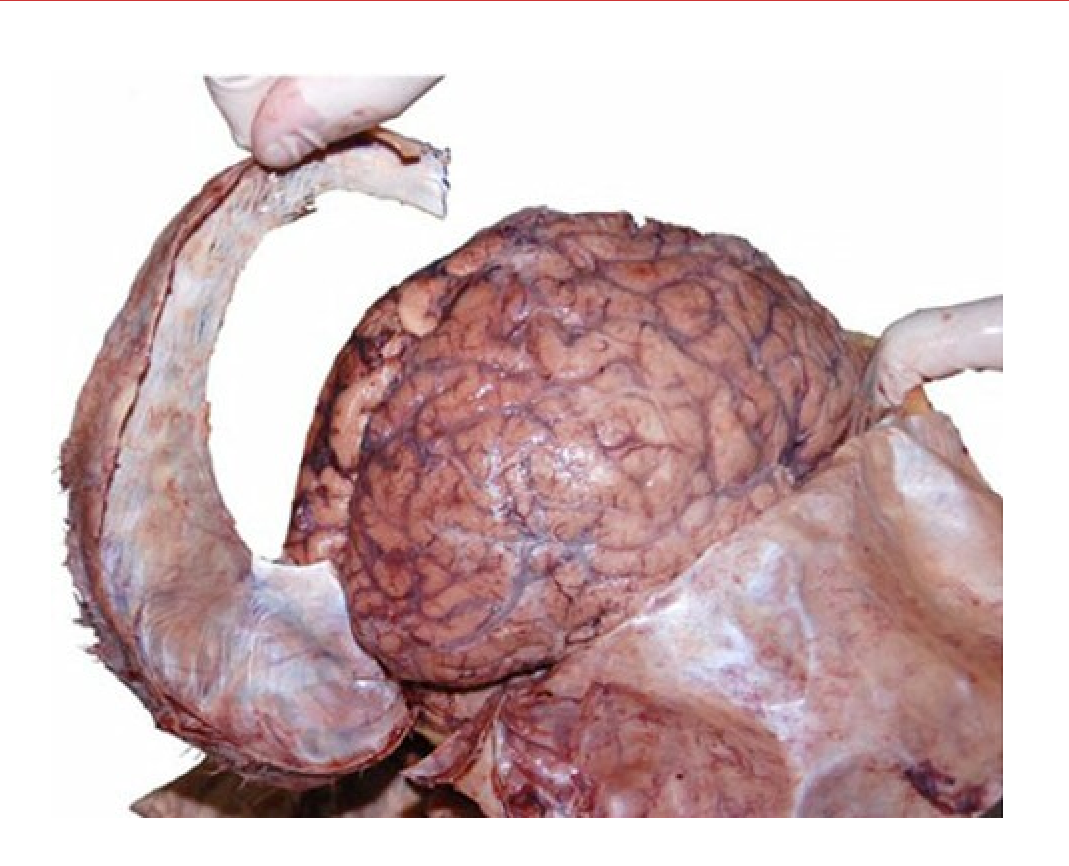


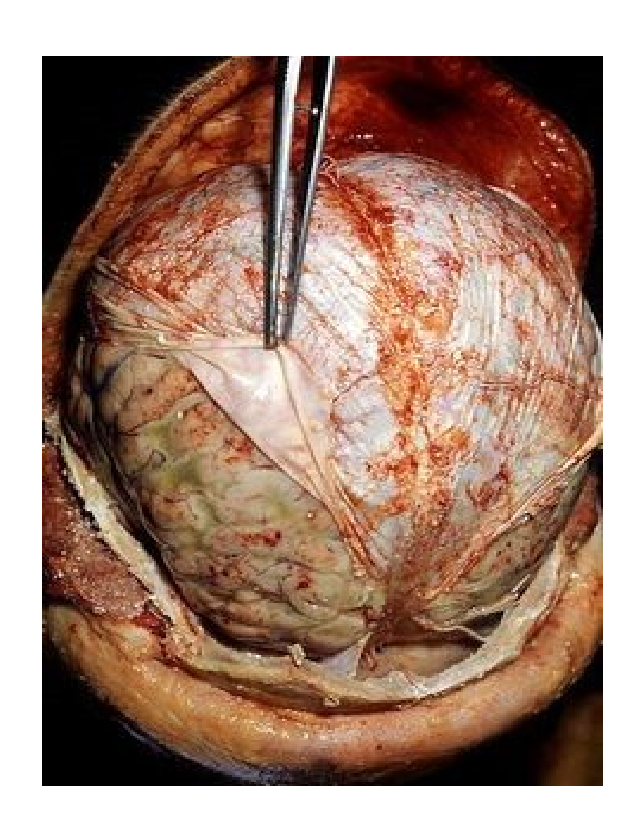
 Function: form **partition-like processes,** between different parts of the brain. They help to **stabilize the brain within the cranial cavity** during movements of head

Dural Folds



I- Falx Cerebri





Dural Folds

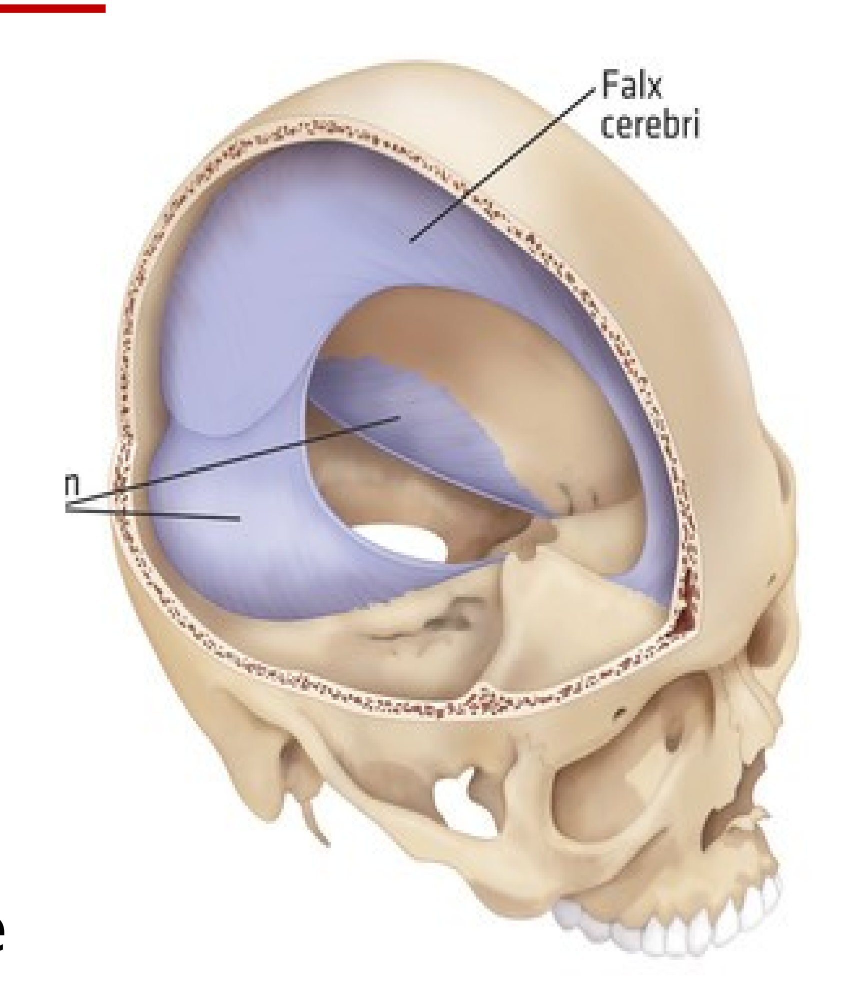


I- Falx Cerebri

- is a *large* ***crescent-shaped***
- projects vertically downward between the ***two cerebral hemispheres***

- **Apex :** It is attached ***anteriorly :***
  - **frontal crest**.
  - **crista galli**.

- ***Base :*** it is attached ***Posteriorly*** to upper surface of



Dural Folds



I- Falx Cerebri

- <u>The margin of falix enclosing **venous sinusis**</u>

Upper border
Superior Sagittal Sinus.

Lower free border
Inferior Sagittal Sinus

Base *Straight Sinus.*

Superior

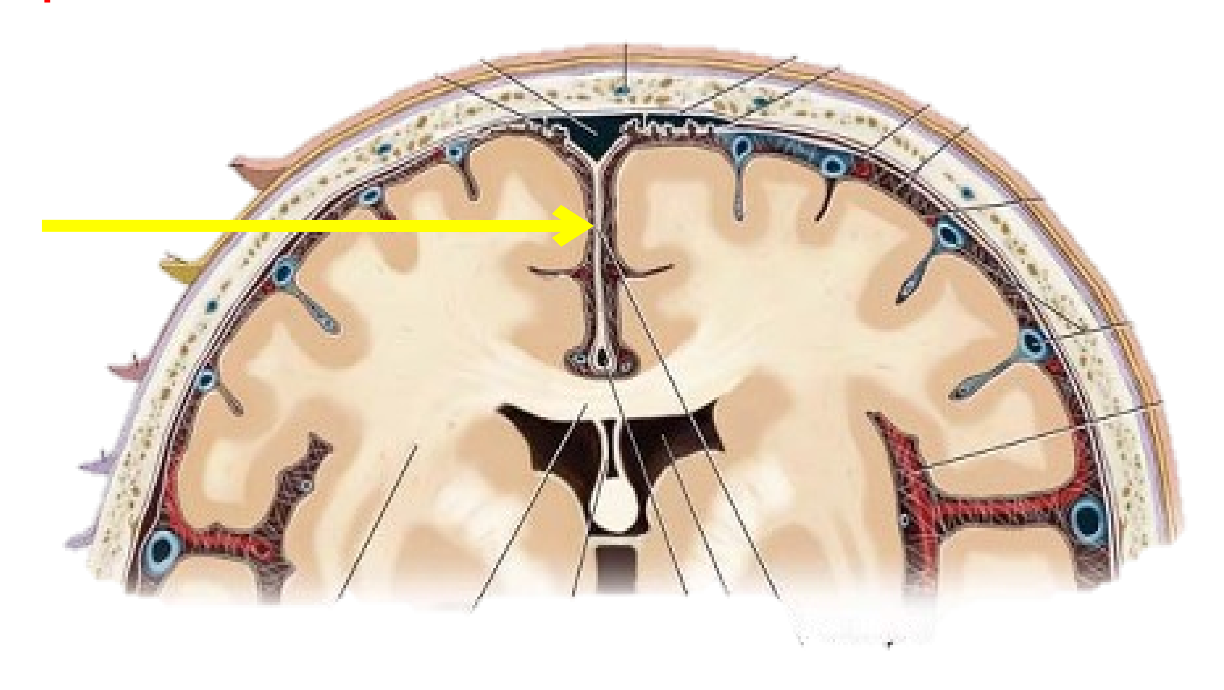
Inferior

Straight Sinus

Lecture Quiz



- Identify the dural fold present in the sagital section?
- Describe its relation with the nearby cerebral hemisphere?



Dural Folds

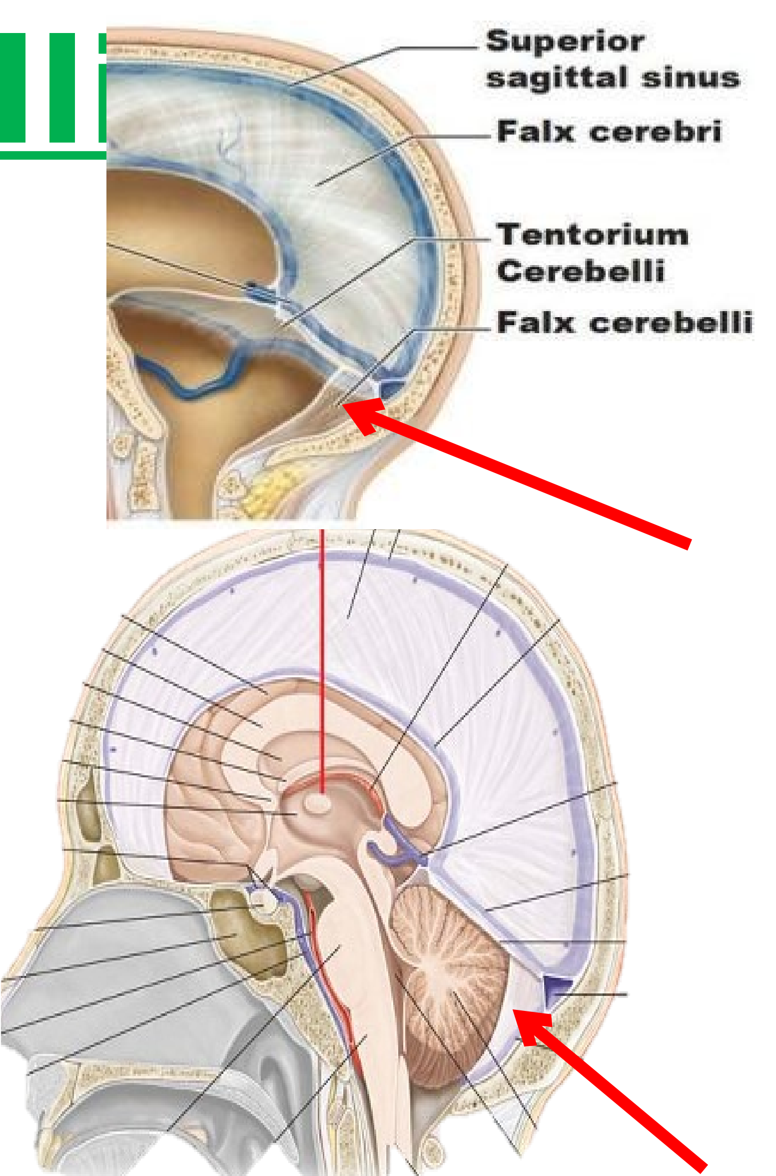


I- Falx Cerebelli

- is a *small* ***crescent-shaped***
- projects vertically downward in *posterior cranial fossa* between the ***two cerebellar hemispheres***

- ***Base :*** it is attached ***(superiorly) lower surface*** of **tentorium cerebelli**

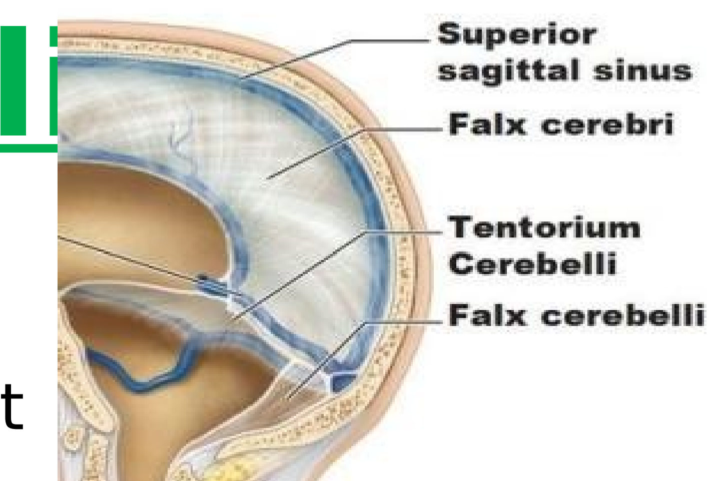
- **Apex :** It is attached ***(inferiorly)*** **the margins of the foramen magnum**



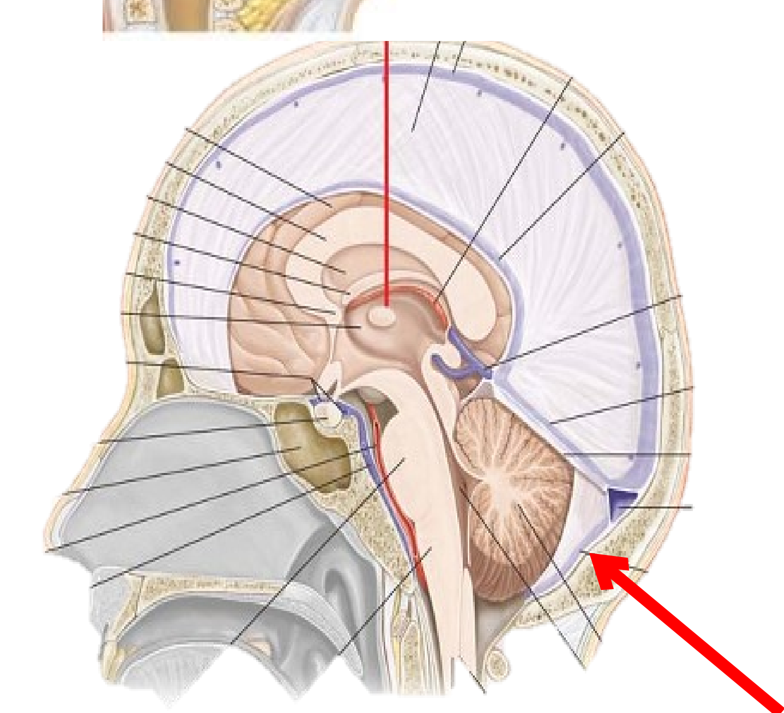
Dural Folds



I- Falx Cerebelli



- ***Posterior border :***
  - attached to internal occipital crest
  - encloses the ***occipital sinus***
- ***Anterior border :*** free



Dural Folds



III- Tentorium Cerebelli

- It forms a **horizontal roof** between cerebral and cerebellar hemispheres

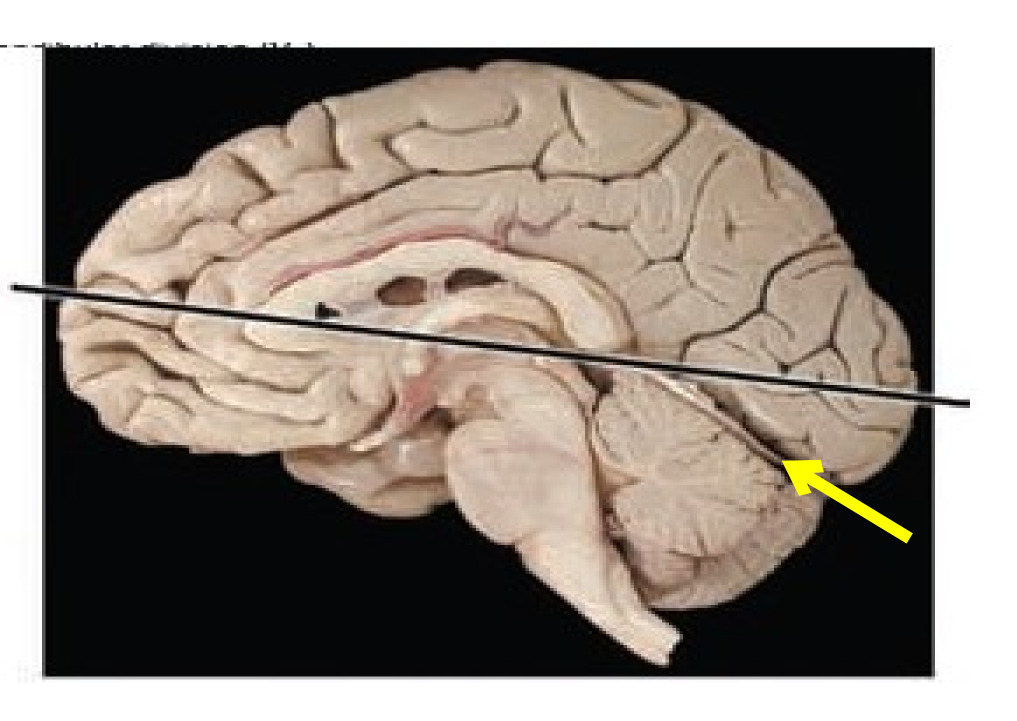
- ***Attached border:***
  - transverse sulcus
  - upper border of petrous bone
  - posterior clinoid processes.

- ***Free border:***
  - forming U-shaped tentorial notch between anterior clinoid processes.

Lecture Quiz



- ✓ Identify the dural fold?
- ✓ Describe its relation?



Lecture Quiz



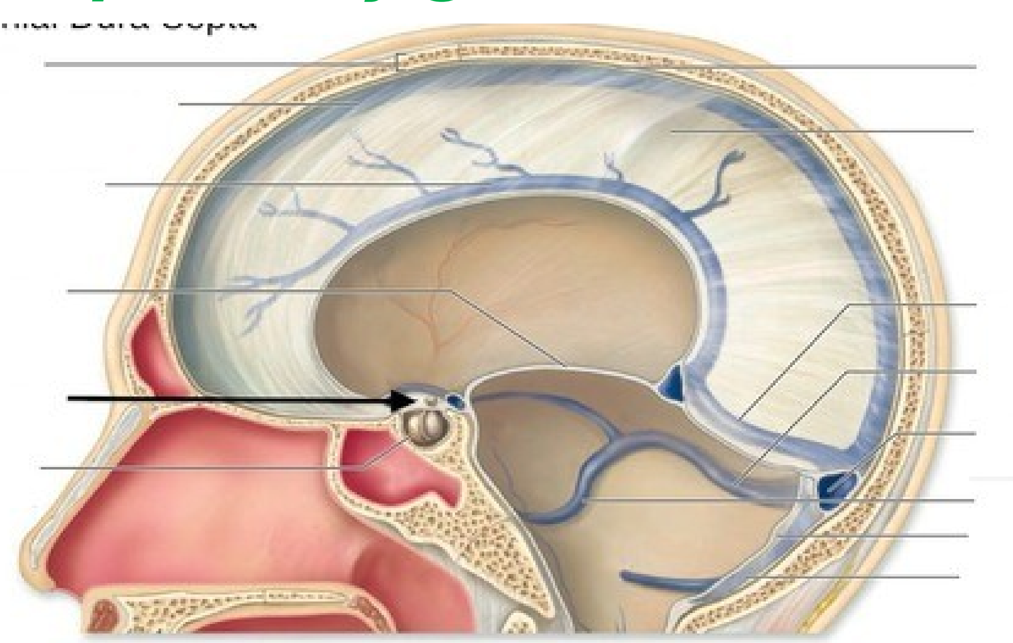
- ✓ Identify the dural fold?
- ✓ Describe its relation?

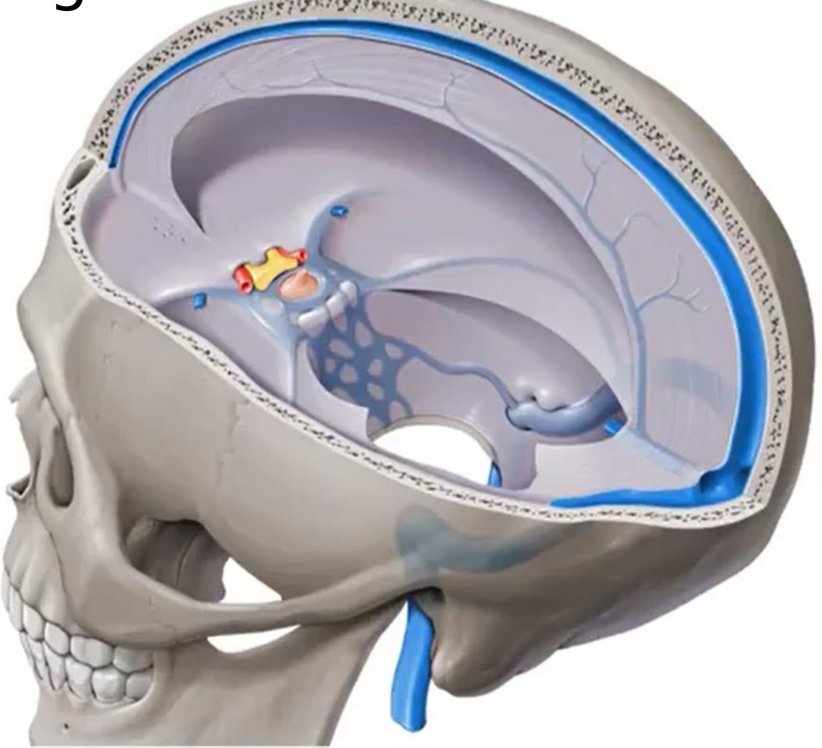
Dural Folds



IV- Diaphragma sellae:

- ✓ Is a small dural fold
- ✓ extending between the 4 clinoid processes
- ✓ roofing the ***hypophyseal fossa***.
- ✓ Has a central opening for passage of ***pituitary gland***.



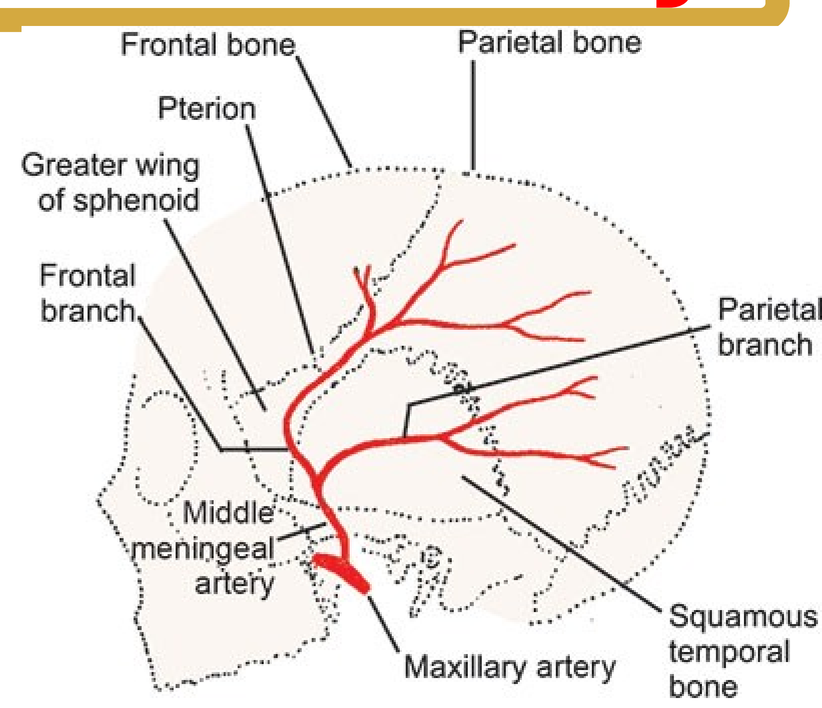


lood and Nerve supply of the dura mater

	Blood supply	Nerve supply
Anterior cranial fossa	**Ophthalmic artery.** **Middle meningeal artery.**	▪ **Ophthalmic nerve.**
Middle cranial fossa	**Middle meningeal artery.** **Accessory meningeal artery.**	▪ **Maxillary nerve.** ▪ **Mandibular nerve.**
Posterior cranial fossa	**Occipital artery.** **Vertebral artery.**	▪ **Branches from C1, C2 and C3 nerves.** ▪ **Branches from 9 & 10 cranial**

N.B: Anterior ethmoidal nerve and vessels are the branches of ophthalmic nerve and vessels supplying

Middle Meningeal Artery



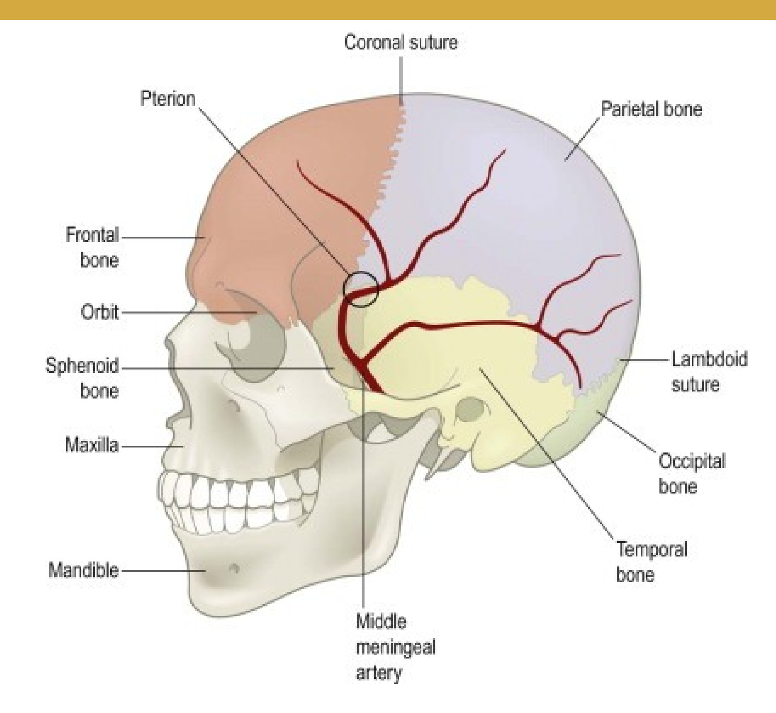
 Origin: from the first part of maxillary artery

 Course: Runs upwards to enter the middle cranial fossa through the foramen spinosum it runs between the two layers of the dura.

- It divides into
  - I. **frontal branch.**
  - II. **parietal branch.**
- **It supplies**
  1. dura mater
  2. Skull bones.

Middle Meningeal Artery

Surface Anatomy:



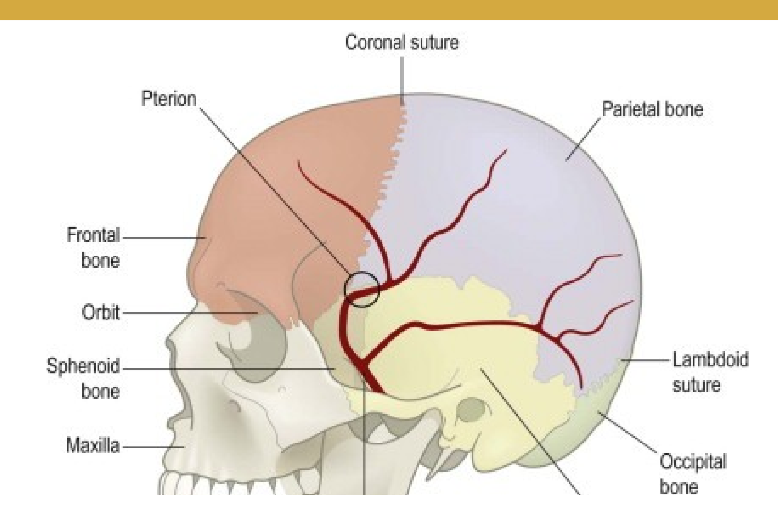
Surface Anatomy:

a. Artery enters skull opposite a point *immediately* above the middle of zygomatic arch.

b. It terminates into 2 terminal divisions *2 cm* above the middle of zygomatic arch.

c. Center of pterion is *4 cm* above the middle of zygomatic arch and 3½ cm behind fronto-zygomatic suture. The pterion is grooved on the inside by the middle meningeal vessels, (*It is the thinnest part of the skull and is liable to fracture*).

Middle Meningeal Artery



Applied Anatomy:

A tear in the middle meningeal artery following head injury may cause extradural hemorrhage.

a. The frontal branch is commonly involved. The resulting hematoma presses on the motor area, giving rise to *contralateral hemiplegia*.

b. For decompression, the burr-hole (trephining) is made over the pterion (4 cm above the midpoint of zygomatic arch).

HEAD TRAUMA



❖ **Epidural hematoma (Artery) middle meningeal artery rupture**

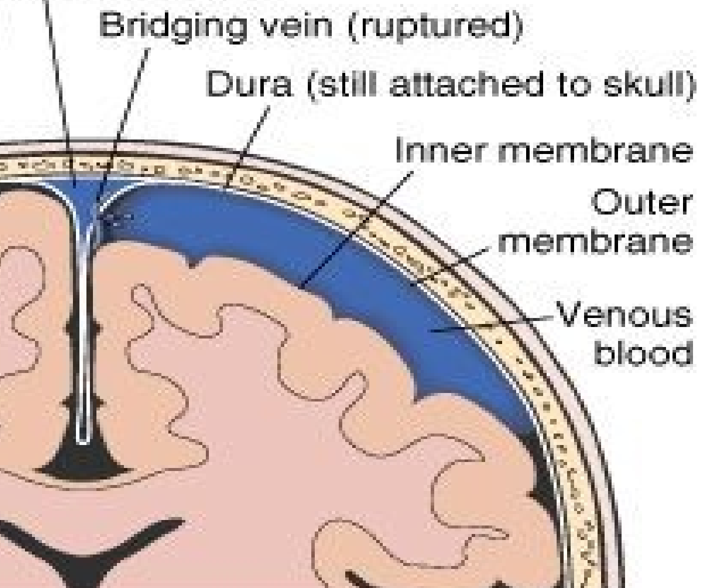
Usually due to blow to the side of the head at the pterion (area where skull is thinnest/easiest to fracture).

Fracture may rupture the anterior branch of middle meningeal artery.

2. Subdural hematomas (Veins) usually of venous origin

tears in bridging veins that cross the subdural space.

is more common



A. Epidural hematoma B. Subdural hematoma

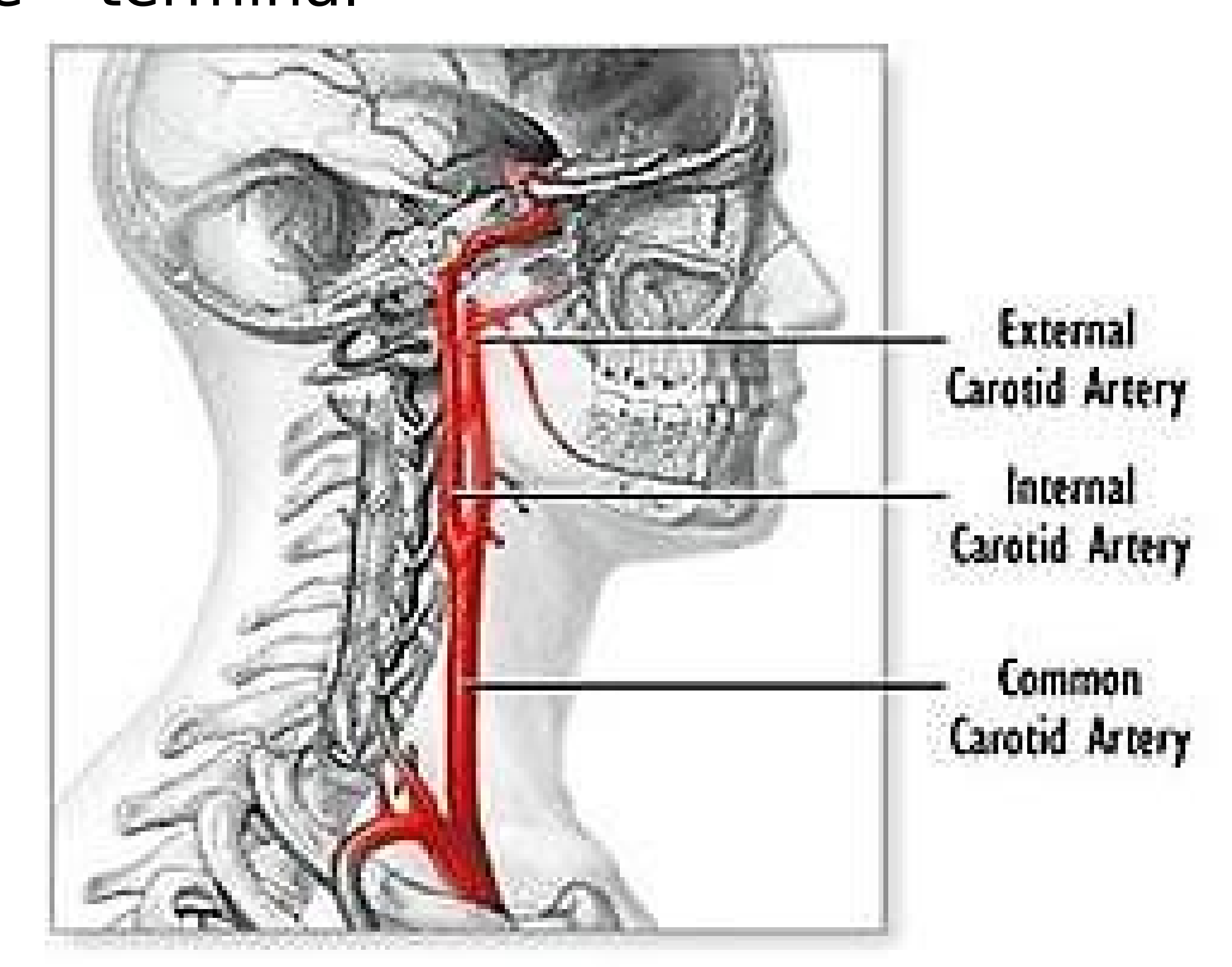
HEAD TRAUMA



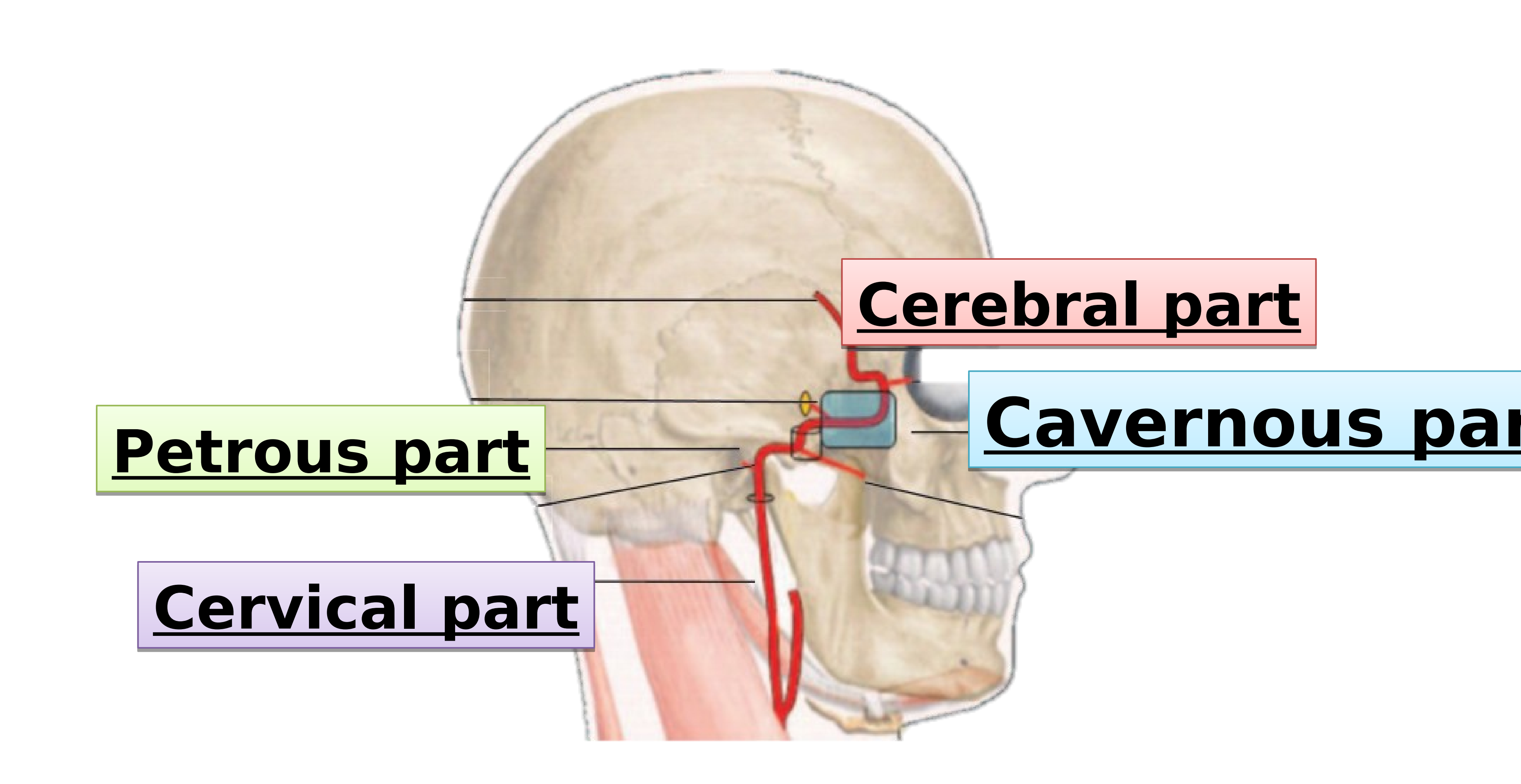


Internal carotid Artery

Origin: Begins in the neck as one of the terminal branches of CCA



Internal carotid Artery



References:

1 Snell's clinical anatomy by regions (2019): 10th Edition

2- Clinically oriented anatomy, K.L. Moore & A. F. Dalley

3- Grey's anatomy for students, Drake et. al.